

**CLASS 334, TUNERS****SECTION I - CLASS DEFINITION**

This class includes:

(1) Tuners (as defined in the Glossary). In function the tuner serves to select and pass or reject a particular frequency from a signal presented to the tuned circuit while attenuating or suppressing the passage or rejection of any other frequency that may be present in the signal. Generally the tuner consists of an inductor and capacitor, one or both of which may be variable, connected together in such a manner as to form a resonant circuit. For classification here, some means must be present in the tuner to vary the mean resonant frequency of the tuner from one frequency to another. The means present in the tuner should be something more than just the incidental showing of a generalized variable impedance element, but should be some means which is included in the circuit for the express purpose of making the resonant circuit variable over a range of frequencies. This means usually is in the form of a specific variable impedance device, such as an inductor or capacitor, the variation of which changes the electrical parameters of the circuit thus causing a shift in resonance of the circuit. The means may, however, consist of two or more impedances of fixed value which are adapted to be switched or substituted into or out of the resonant circuit. Excluded are wave filters which are closely analogous in that they are designed to pass or reject a single frequency or band of frequencies. Wave filters, generally, have no provisions or means which are particularly designed for and meant to vary the mean frequency of the filter during operation of the filter unit in a radio circuit. The wave filter may have "trimmer" means which is designed to "peak" the response of the filter, but these trimmers are not meant to be used in varying the resonance frequency of the filter during the operation of the filter in an electrical circuit such as, for example, a radio receiver. A wave filter having trimmer means is usually adjusted prior to the installing of the filter in an electrical circuit. The filter once adjusted is rarely, if ever, adjusted again unless the resonance characteristic of the filter requires some additional peaking. A circuit which has means to merely broaden or narrow the band which is being passed without varying or changing the means or center frequency to which the circuit is tuned does not amount to tuning but is considered a filter for classification with wave transmission lines and networks (see References to Other Classes, below). However, a circuit which broadens or narrows the pass band and which also varies the mean or center frequency of a filter is considered a tuner.

(2) Included also are tuners with perfecting structure, such as a remote control circuit, a resonance indicator, tuner units with an electromagnetic operator, or tuners with automatic frequency centering circuits which are not otherwise classifiable.

(3) Also included are tuners combined with or incorporated in other structure and not elsewhere classifiable, such as a tuner combined with a tube socket or a special punched chassis. Also included are tuners combined with or incorporated in diverse nonelectrical devices and which combination is not classifiable elsewhere.

(4) Included also are tuners constructed as by the type of actuator used or from selected material so that the impedance values of the tuner changes particularly well in response to a particular condition or change in a particular condition such as current and/or voltage as, for example; a tuner using a saturable core type inductor; a tuner using a voltage responsive capacitor; or a tuner responsive to a magnetic field. Also included are tuners usually of the mechanically variable type together with a condition sensing actuator which changes the mechanical adjustment of the tuner in response to a condition or a change in condition. An example, of such a tuner is one having a heat sensitive actuator, or a tuner that is deformable as by compression by a weight or force.

(5) Subcombinations and components of tuners not otherwise classifiable, such as a resonance indicator, are classified in this class.

**SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS****A. TUNERS CLASSIFIED ELSEWHERE:**

Certain circuits or devices which may be considered tuners are not classified here. See References to Other Classes, below, for tuned resonance type wave filters which may be referred to as a tuner and the resistor-capacitor circuits such as bridged-T, double-T or Weir Bridge networks, for example, which are sometimes referred to as tuners. Also see the Search Class notes for tunable resonators of the distributed parameter type in which there are no lumped impedance elements present and where only a single resonator is used. The inclusion of a lumped impedance element in the resonant circuit or the coupling of two or more distributed parameter type units together to form a single tuner will result in classification in this class.

#### B. TUNERS COMBINED WITH OR INCORPORATED IN OTHER DEVICES:

As stated above, this class includes tuners combined with or incorporated in other structure not elsewhere classified. See Subclass References to the Current Class for tuners combined with various other devices and for tuners combined with or having shielding or housing means. The combination of a tuner with or in other structure or circuits is very common. A partial list of the classes and subclasses including this combination is given in References to Other Classes, below.

#### C. TUNER COMPONENTS AND SUBCOMBINATIONS:

Included in References to Other Classes, below, is the classification of the most common subject matter which may constitute a part or subcombination of a tuner.

#### D. DEVICES SIMULATING TUNERS:

See References to Other Classes, below, for wave filters, and resonators of the distributed parameter type.

#### E. MEASURING OR TESTING TUNERS

This class does not provide for either methods of or apparatus for measuring and testing tuners. If the measuring or testing is of a mechanical nature or not otherwise classified, classification is in Class 73, Measuring and Testing. See also the Search Notes in Class 73 for a more detailed field of search to measuring and testing devices and systems. If the measuring or testing involves determining the frequency or electrical properties of the tuner, classification is in Class 324, Electricity: Measuring and Testing, subclasses 600+.

### SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

#### SEE OR SEARCH THIS CLASS, SUBCLASS:

- 4, for magnetic field responsive tuners.
- 5+, for condition responsive tuners.
- 12+, , for saturable core type tuners.
- 39, for tuners combined with various other devices.
- 40, for a lumped resistor element connected in a tuned circuit.
- 85, for tuners combined with or having shielding or housing means.

### SECTION IV - REFERENCES TO OTHER CLASSES

#### SEE OR SEARCH CLASS:

- 40, Card, Picture, or Sign Exhibiting, for means for displaying information, the information that is displayed may be the position or channel to which a tuner is adjusted.
- 40, Card, Picture, or Sign Exhibiting, appropriate subclasses for means to indicate the position or band to which a tuner is positioned. (See "Tuner Components and Subcombinations," above.)
- 73, Measuring and Testing, for measuring and testing devices generally. See "Measuring or Testing tuners", above.
- 74, Machine Element or Mechanism, subclasses 10+ for machine elements and mechanisms particularly adapted for mechanically rotating one or more shafts of electronic tuning devices into desired angular positions.
- 74, Machine Element or Mechanism, subclasses 10+ for tuners by name only combined with shaft operators for radio tuners. (See "Tuners Combined With or Incorporated in Other Devices" above)
- 74, Machine Element or Mechanism, subclasses 10+ for shaft operators which are particularly adapted for mechanically rotating one or more shafts of electronic tuning devices into desired angular positions, and subclasses 527+ for detents which are used in connection with fixed and movable members such as a tuner housing and shaft and which are especially adapted to check or arrest the motion of the movable element. Such detents are commonly used to properly position the tuner to some particular frequency or band of frequencies. (See "Tuner Components and Subcombinations," above.)
- 84, Music, appropriate subclasses for musical devices that may use tuned circuits, especially subclasses 671 through 746 for electrical tone generation by the use of tuned sound generators or resonators.
- 116, Signals and Indicators, subclasses 241+, for indicators attached to or associated with some movable or adjustable radio tuning devices to indicate the movement, adjustment or position of such devices. Usually the indicator is of the movable-pointer and scale type.

- 174, Electricity: Conductors and Insulators, sub-classes 35+ for shields and screens, per se, and subclasses 50+ for electrical boxes and housings, per se.
- 200, Electricity: Circuit Makers and Breakers, appropriate subclasses for electrical make and break switch, per se, which may be used in a switch type tuner.
- 200, Electricity: Circuit Makers and Breakers, appropriate subclasses for circuit makers and breakers of the switch type which may be used in combination with several inductors and/or capacitors to form a switch type tuner. (See "Tuner Components and Subcombinations," above)
- 219, Electric Heating, subclass 750 for microwave heating with tuned circuits.
- 219, Electric Heating, subclasses 600+ for inductive heating, note subclass 750 for microwave heating with tuned circuits, and subclasses 764+ for capacitive dielectric heating. (See "Tuners Combined With or Incorporated in Other Devices,")
- 250, Radiant Energy, subclass 250 for wave meters utilizing tuners as an element thereof. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 307, Electrical Transmission or Interconnection Systems, subclass 105 for electrical transmission or interconnection systems with harmonic filters which may be adjustable.
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 5.46+ for cathode-ray tube circuits in which the cathode ray passes through plural hollow distributed parameter devices that are tunable; subclasses 5.53+ for circuits in which the cathode ray passes through a tunable hollow distributed parameter device, and subclasses 39.55+ for distributed parameter resonator type magnetrons having variable tuning means.
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 5.46+ for a cathode-ray tube circuit which has plural hollow indicator or distributed parameter type inductive structure; subclasses 5.53+ for cathode ray tube circuits with tunable distributed parameter type inductive structure, and subclasses 39.55+ for combined load device or load device temperature modifying means and electrical magnetron circuit device structure of the variable tuned distributed parameter resonator type. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 318, Electricity: Motive Power Systems, subclass 16 for electrical motor power systems which are controlled from a distance by space transmitted electromagnetic or electrostatic energy and which are closely analogous to some remote controlled tuner circuits; subclass 460 for electrical motor power systems which have automatic and/or time-delay means which are responsive to sound, supersonic vibration or mechanical vibration, and subclass 480 for systems responsive to radiant energy.
- 318, Electricity: Motive Power Systems, subclass 16 for a motor control system controlled by space transmitted electromagnetic or electrostatic energy, and subclass 510 for electrical motive power systems having an impedance controlled armature or primary circuit which comprises diverse impedances including an inductor and capacitor. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 318, Electricity: Motive Power Systems, appropriate subclass for a motor system which may be used to drive and control a tuner. Note especially subclasses 445+ for motor control systems which automatically start and/or stop at a particular point such as might be used with a remotely controlled television type tuner. (See "Tuner Components and Subcombinations,")
- 322, Electricity: Single Generator Systems, subclass 78 for generator control systems which have plural impedances in the excitation circuit, the impedances forming a tuned circuit.
- 322, Electricity: Single Generator Systems, subclass 78 for generator control systems which have a tuned or resonant circuit in the excitation winding or control circuit. (See "Tuners Combined With or Incorporated in Other Devices," above)
- 324, Electricity: Measuring and Testing, subclasses 76.41+ for measuring, testing or sensing electricity, per se, by frequency comparison, and subclass 76.51 for measuring, testing or sensing electricity, per se, by a tuning step.
- 324, Electricity: Measuring and Testing, subclasses 76.41+ for circuits which measure, test or sense electricity, per se, by frequency comparison. The frequency comparison circuit usually has at least one or more tuned circuits. See also, subclass 76.51 of Class 324 for frequency testing systems in general utilizing tuning. (See "Tuners Combined With or Incorporated in Other Devices," above)

- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 3+ for miscellaneous phase comparing circuits and subclasses 40+ for miscellaneous frequency comparing circuits, either of which may utilize a tuned circuit.
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 3+ for miscellaneous phase comparing circuits and subclasses 40+ for miscellaneous frequency comparing circuits, either of which may utilize a tuned circuit. (See Lines With Other Classes, "Tuners Combined With or Incorporated in Other Devices," above.)
- 329, Demodulators, appropriate subclasses for demodulators with tuned input or indicator.
- 329, Demodulators, appropriate subclasses for demodulators with tuned input. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 330, Amplifiers, subclass 65 for structure of various amplifier elements such as a tuned circuit; subclasses 144+ for amplifier stages having a variable impedance element which is controlled by a separate control means; subclass 154 for cascaded amplifiers having a resonant circuit used in the interstage coupling network; subclasses 165+ for interstage coupling of the transformer type; subclasses 188+ for transformer coupled input circuits and subclasses 195+ for amplifiers having transformer coupling in the output circuit.
- 330, Amplifiers, subclass 154, for cascaded amplifier stages having a transformer or resonant circuit in the interstage coupling, subclasses 157+ for interstage coupling networks which may include resonant circuits, subclasses 185+ for input coupling networks and subclasses 192+ for output coupling networks which may include resonant circuits. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 331, Oscillators, subclasses 1+ for oscillators having automatic frequency stabilization means using a phase or frequency sensing means; subclasses 96+ for oscillators with distributed parameter resonators; subclasses 117, 128, and 167+ for inductor-capacitor type oscillators, and subclasses 177+ for oscillators having frequency adjusting means.
- 331, Oscillators, appropriate subclasses, for oscillator circuits which contain a frequency or period determining element such as a resonator or tuning means. See subclasses 1+ for automatic frequency controlled oscillators, subclasses 167+ for oscillators having an L-C type tuned circuit, and subclasses 177+ for frequency adjusting means combined with the oscillator circuit. (See "Tuners Combined With or Incorporated in Other Devices," above)
- 332, Modulators, subclass 140 and 142+ for variable reactance tubes in a frequency modulator and subclass 175 for a variable tuned circuit in an amplitude modulator.
- 332, Modulators, appropriate subclasses for modulators using tuned circuits and particularly subclass 175 for a variable tuned circuit in an amplitude modulator. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 333, Wave Transmission Lines and Networks, appropriate subclasses for wave transmission lines and networks which may be resonant at one or more frequencies, especially subclasses 167+ for wave filter coupling networks and for tuned resonance type wave filters which may be referred to as a tuner. (Also found in these subclasses are the resistor-capacitor circuits such as bridged-T, double-T or Weir Bridge networks, for example, which are sometimes referred to as tuners) ; subclasses 235+ for variable resonators of the distributed parameter type, and subclasses 245+ for long line elements. (see "Tuners Classified Elsewhere" above)
- 333, Wave Transmission Lines and Networks, appropriate subclasses, especially subclasses 167+ for wave filters in general having fixed center frequencies, particularly indented subclass 175 for resonant type wave filters, and see subclasses 219+ for tuners of the distributed parameter resonator type in which there are no lumped impedance elements present and where only a single resonator is used. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 333, Wave Transmission Lines and Networks, subclasses 213+ for positive or negative reactance networks of the active element type and subclass 235 for resonators of the distributed parameter type which may be mechanically and/or electrically connected together to form a tuner. (See "Tuner Components and Subcombinations," above.)

- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 209+ for magnets and electromagnets.
- 336, Inductor Devices, appropriate subclasses for inductors, per se, which may have a fixed or variable inductance value.
- 336, Inductor Devices, appropriate subclasses for inductor devices of the type which are adapted to be combined with some capacitor means to form a tuned circuit. (See "Tuner Components and Subcombinations," above.)
- 338, Electrical Resistors, appropriate subclasses for resistors, per se, which may be closely analogous to certain types of tuners.
- 338, Electrical Resistors, appropriate subclasses for resistor elements which may be used in combination with an inductor and capacitor means to form a tuned circuit. (See "Tuner Components and Subcombinations," above.)
- 340, Communications: Electrical, subclasses 825+ for selective remote control system; and subclasses 825.69 and 825.72 for systems having a control signal utilized to control a remotely located system or device.
- 340, Communications: Electrical, subclass 825.69 and 825.72 for systems having a control signal used for control purposes. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 343, Communications: Radio Wave Antennas, subclasses 745+ for an antenna having variable reactance for tuning, and subclasses 850+ for antennas with a coupling network or impedance in the lead-in.
- 343, Communications: Radio Wave Antennas, appropriate subclasses for radio wave energy systems utilizing tuned circuits, subclass 745 for antennae with variable reactance means for tuning the antenna. (See "Tuners Combined With or Incorporated in Other Devices" above.)
- 346, Recorders, subclass 37 for a recorder device combined with and responsive to the tuning 346, Recorders, subclass 37 for recording means which is responsive to the tuning means of a radio receiver. (See "Tuners Combined With or Incorporated in Other Devices above")
- 348, Television, subclasses 731+ for tuners associated with television receiver circuitry including search tuners and tuners combined with indicator, subclass 734 for remote control of a tuner in a television receiver, and subclass 735 for automatic frequency control circuits.
- 361, Electricity: Electrical Systems and Devices, subclass 113 for electrical safety protection systems and devices having a tune circuit; subclass 270 for transformer or inductors combined with a capacitor; and subclasses 271+ for capacitors, per se.
- 361, Electricity: Electrical Systems and Devices, subclass 113 for electrical equipment having safety or protection equipment which employs a tuned circuit, and subclasses 161 and 147 for frequency responsive circuits for relays and electromagnets in which the frequency responsive circuit usually has one or more tuned circuits. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 361, Electricity: Electrical Systems and Devices, subclasses 271+ for capacitors, per se, which are used in combination with an inductance means to form a tuner. (See "Tuner Components and Subcombinations," above.)
- 370, Multiplex Communications, appropriate subclasses, particularly subclasses 343+ for combining or distributing information via frequency channels in communication over free space, and subclasses 480+ for combining or distributing information via frequency channels in communication over wire.
- 370, Multiplex Communications, appropriate subclasses, particularly subclasses 343+ for combining or distributing information via frequency channels in communication over free space, and subclasses 480+ for combining or distributing information via frequency channels in communication over wire. (See "Tuners Combined With or Incorporated in Other Devices," above.)
- 373, Industrial Electric Heating Furnaces, subclasses 138+ for electrical induction type furnaces involving a charge supported by an adequate furnace structure and placed in electromagnetic relationship with an inducing winding, the charge forming the secondary of the coil winding. The coil winding may be resonant with a capacitor.
- 455, Telecommunications, subclasses 120+ for radio transmitters with tuners; and subclasses 150.1+ for receivers with tuners.
- 455, Telecommunications, subclasses 100+ for a transmitter having a tuner; and subclasses 150.1+ for a receiver having a tuner. (See "Tuners Combined With or Incorporated in Other Devices," above)
- 455, Telecommunications, subclasses 150.1+ for apparatus such as a housing that may be used

with a tuner. (See “Tuner Components and Subcombinations,” above)

## SECTION V - GLOSSARY

### CAPACITOR

That property of a system of conductors and dielectrics used to secure an appreciable capacitance by allowing the storage of electricity when a potential difference exists between the conductors. There must be at least two or more conductors separated by a dielectric.

### CAPACITANCE

The property of a capacitor to store and hold an electric charge and which is equivalent to the ratio of the equivalent charge stored in the capacitor to the resultant change of potential.

### ELECTROMAGNETIC OPERATOR

A machine or device which is capable of exerting a force upon the control or actuator of an element or circuit to thus move or control the element or circuit, the machine or device being operated by the interaction of the magnetic effect of an electrical current and/or magnetic field. An example, of this type of machine or device is a relay, solenoid or electric motor connected to the shaft of a variable capacitor, the machines or devices responding to a flow of current and/or voltage through them to thus drive or move the shaft of the variable capacitor.

### FREQUENCY

The number of complete alternations or cycles made by an alternating signal per unit of time. The frequency unit most used is cycles per second.

### FREQUENCY BAND

A plurality of different frequency channels which are grouped together into a particular bunch or group of channels all designated or used for the same purpose. An example of this is the broadcast band which consists of a plurality of frequency channels whose center frequencies are separated by a specified amount, each frequency being used for the same purpose, namely the transmission of speech. A second example of a band of frequencies is the use of certain channels of frequencies for the transmission of television. Here the common purpose of the plural channels of frequencies making up

the band is the transmission of a video signal plus an audio signal.

### INDICATOR

An element or device which is particularly adapted to point out or show, usually visually, the position and/or condition to which a given element or elements are adjusted as, for example, a scale and pointer, one of which is held stationary while the other is connected to a rotatable or movable shaft such as the shaft of a variable capacitor. A second example would be the use of a meter to indicate the amount of current and/or voltage flowing in a given circuit.

### INDUCTANCE

That property of an electrical circuit, or of two or more neighboring circuits, by which a varying current produces or induces an electromotive force in the circuit or neighboring circuits. If an electromotive force is induced in the neighboring circuit or circuits, the term mutual inductance is used.

### INDUCTOR

An impedance device comprising a coil means, with or without core means, for introducing inductance into an electric circuit. Both transformers and inductive reactors are included within the meaning of “inductor”.

### RESONANCE

The point in the adjustment of a tuned circuit to a particular channel or signal frequency at which the inductive reactance equals the capacitive reactance. The resonance frequency may also be described as the point where the oscillation or vibration present in the circuit may be maintained with the least amount of external excitation with the excitation producing a relatively large amplitude of oscillation or vibration.

### TUNER

A device for tuning which consists of an inductor and capacitor or an inductor, capacitor and resistor so connected and resistor so connected as to form a resonance circuit, the mean frequency or channel to which the tuner is resonant being variable. The resistance may be in the form of the inherent resistance of the circuit or a lumped resistance element connected in the circuit. For a lumped resistor element connected in a tuned circuit, see Subclass References to the Current Class, above.

## TUNING

The step or steps by which a tuner is adjusted in relation to a signal frequency or channel in order to obtain optimum or maximum resonance of the tuner circuit or system at some selected operating point or signal frequency.

## VARIABLE INDUCTOR

A passive inductor wherein the inductor device includes a movable element which may be adjusted to different positions or adjusted to vary its physical dimensions to change the effective inductance from one value to another. Examples of such movable elements are: a tap changing switch, a distortable coil or core, or movable coupled coils. Inductor devices designed to change inductance (1) as a function of the current and/or voltage flowing through the inductor winding, or (2) in accordance with a magnetic field or bias applied to the core or coil of the device, or (3) as a function of the ambient temperature or some external condition applied to the device, and wherein no physical element of the inductor is moved to effect such change in inductance, are not considered adjustable under the above definition. For such variable inductors, see Subclass References to the Current Class, above for for magnetic field responsive tuners, for condition responsive tuners, and for saturable core type tuners.

## SUBCLASSES

**1** This subclass is indented under the class definition. Subject matter wherein the tuning unit consists of two or more tuners of different types connected together either mechanically and/or electrically to form a single unitary tuner.

- (1) Note. One tuner usually covers a lower frequency while the second tuner cover a higher frequency as, for example, a VHF-UHF tuner. Gang operated or combined tuners which cover only one frequency range, such as for example an intermediate frequency tuning strip, is not considered a combined tuner for this class.

## SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclass 10.45 for operators used on plural shafts.

- 455, Telecommunications, appropriate subclasses for radio receivers which may use a plurality of tuning means.

**2**

This subclass is indented under subclass 1. Subject matter wherein the combined tuners comprise at least two different disk type or two different cylinder type tuners.

- (1) Note. For a definition of a disk type tuner see subclass 49 below and for a definition of a cylinder type tuner see subclass 50 below.
- (2) Note. The combination of a disk or cylinder type tuner combined with another type tuner such as, for example, a wafer switch or resonant line tuner are not properly classified in this subclass. This subclass is restricted to tuning units in which only at least two species of disk or two species of cylinder type tuners are combined to form the tuning unit.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 49, for disk type tuners, per se.  
50, for cylinder type tuners, per se.

**3**

This subclass is indented under subclass 1. Subject matter wherein a plurality of tuning units are mechanically and/or electrically built together, each of the tuning units mutually sharing a common tuning element with the tuning units being so constructed that they are operated in sequence one after the other by adjusting the common tuning element.

- (1) Note. Subject matter usually found in this subclass consists of a cavity or resonator type tuner mechanically and/or electrically combined with an inductor-capacitor type tuning unit, the plunger or contact used to tune the cavity or resonator also being used to tune the inductor-capacitor type tuning unit. Thus the tuning element is mutually common to both type tuners.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 41+, for tuners of the resonant line or distributed parameter type.

- 65+, for tuners in which both the inductor and capacitor are variable and especially subclasses 66+ for tuners with a mutual inductor and capacitor varying element.
- 4** This subclass is indented under the class definition. Subject matter wherein the tuned circuit is responsive to and varied by an external magnetic field applied to the tuned circuit or some element thereof. For example, the magnetic field is produced by a specially movable permanent magnet.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 11, for tuners having a capacitor which is responsive to voltage or current variations.
- 12+, for tuners having a saturable core type inductor which is responsive to voltage or current variations.
- SEE OR SEARCH CLASS:
- 323, Electricity: Power Supply or Regulation Systems, subclass 250, 330, and 362 for miscellaneous inductive reactance systems where the reactor includes a permanent magnet as a part thereof.
- 336, Inductor Devices, subclass 110 for inductors which are provided with a permanent magnet to modify the magnetic flux distribution.
- 5** This subclass is indented under the class definition. Subject matter including a tuner, which has at least one variable element that is mechanically variable, linked with actuating structure which senses and responds significantly well to a particular stimulus or condition which is external of the electrical circuit or a change in such external stimulus or condition to thereby cause the variable element to change, adjust or correct the resonant frequency of the tuned circuit; or including a tuner which has at least one variable element which is nonmechanically variable and which has the property, as by chemical composition, of changing its reactance value in response to a particular stimulus or condition which is external of the electrical circuit or a change in such external stimulus or condition to thereby cause
- a change, adjustment or correction in the resonant frequency of the tuned circuit.
- (1) Note. For classification here the actuator must be something more than merely adapted to have a force applied thereto for the actuation of the mechanical variable or adjustable tuner, as a knob, pedal or handle. The actuator must sense the condition or change in condition, and respond in some manner as by moving or deforming.
- (2) Note. The tuner element that is affected by the particular external stimulus does not necessarily have to detune the tuner from a particular resonant frequency upon sensing the external stimulus but may adjust or correct the tuned circuit to prevent undesired drifting or change in the resonant frequency of the tuned circuit.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 4, for tuners which are responsive to and varied by a magnetic field applied to the tuned circuit or some element thereof.
- 11, for tuners having a capacitor which is responsive to voltage or current variations within the electrical circuit.
- 12+, for tuners having a saturable core type inductor which is responsive to voltage or current variations within the electrical circuit.
- SEE OR SEARCH CLASS:
- 331, Oscillators, subclasses 175+ for oscillators combined with frequency stabilizing means.
- 336, Inductor Devices, subclass 30 for inductors with condition responsive adjustment means.
- 338, Electrical Resistors, subclasses 13+ for resistors that are responsive to a condition.
- 6** This subclass is indented under subclass 5. Subject matter wherein the tuner includes an inductor and/or capacitor which is responsive to some external stimulus.



## SEE OR SEARCH CLASS:

- 331, Oscillators, subclasses 65+ for oscillators which have a device responsive to an external physical condition, and subclass 176 for temperature or current responsive means in the oscillator circuit.
- 336, Inductor Devices, subclass 30 for inductors with condition responsive adjustment means.
- 361, Electricity: Electrical Systems and Devices, subclasses 280+ for capacitors, per se, which are responsive to a condition.

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This subclass is indented under the class definition. Subject matter wherein the tuner unit is adapted to be operated by a series of manually movable push buttons and/or levers with each button or lever being adapted to selectively move the tuning element through a mechanical mechanism to a different preselected position or frequency when manual power is exerted on a particular button or lever.

- (1) Note. Push buttons and/or levers which energize a motor circuit with the motor furnishing the power to move the tuner to the preselected circuit are not classified in this subclass but in subclasses 17+ below (note especially subclass 29).

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 29, for tuners combined with electromagnetic drive means which tunes to a predetermined station and which may be energized by a push button or lever type switch.

## SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclasses 10.1+ for shaft operators of the radio type which are adapted to turn to or stop on a predetermined position, and subclasses 469+ for control lever and linkage systems, per se.
- 84, Music, subclasses 423+ for keyboard operated musical devices, the keys serving to select the tuned circuit which is to be placed into circuit with an electrical tone generator.

- 455, Telecommunications, subclasses 170.1+ for radio receivers utilizing push button and/or lever operated tuners.

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This subclass is indented under the class definition. Subject matter in which the operation of the tuner is controlled from a relatively distant point removed from the tuner by an extended or remote control device or circuit.

- (1) Note. Remote control devices as found in this subclass may include a tuner having a separate extended control shaft connected to an original shaft of the variable tuner element, thus extending the distance from the tuner to the point where a control knob or operator may be located; or the remote control device may consist of circuit means responsive to space transmitted electromagnetic, electrostatic or radiant energy.
- (2) Note. To be properly classified in this subclass, some significant details of the tuner must be claimed. A tuner broadly recited with details to the control system or device is classified with the control system or device. The control of a tuner plus some other radio circuit, such as, for example, an on-off switch is classified with the radio circuit controlled, such as, for example, radio receivers.

## SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclasses 10+ for positioning or rotating means for one or more shafts of an electronic tuning device such as a radio tuner.
- 307, Electrical Transmission or Interconnection Systems, subclass 140 for remote control switching systems.
- 318, Electricity: Motive Power Systems, subclass 16 for motors which are controlled or supplied by space transmitted electromagnetic or electrostatic energy; subclass 460 for sound or vibration responsive systems, and subclass 480 for radiant energy responsive systems.
- 340, Communications: Electrical, subclasses 825+ for selective remote control systems.

- 343, Communications: Radio Wave Antennas, subclasses 745+ for antennae with a variable reactance for tuning the antenna.
- 348, Television, subclass 734 for television receiver circuitry having remote control means associated therewith.
- 361, Electricity: Electrical Systems and Devices, subclasses 173+ for photosensitive circuits for relays and electromagnets.
- 455, Telecommunications, subclasses 151.1+ and 352+ for radio receivers with remote control.
- 9** This subclass is indented under subclass 8. Subject matter in which the remote controlled tuner has an electromagnetic operator, such as an electric motor, solenoid, or the like.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 17+, for tuning units with electromagnetic operators which are not remotely controlled.
- SEE OR SEARCH CLASS:
- 318, Electricity: Motive Power Systems, subclass 16 for motors which are controlled or supplied by space transmitted electromagnetic or electrostatic energy; subclasses 560+, for electric motor position servomechanism; subclasses 460+ for sound or vibration responsive systems, and subclass 480 for radiant energy responsive motor systems.
- 455, Telecommunications, appropriate subclasses.
- 10** This subclass is indented under subclass 9. Subject matter in which the electromagnetic operator is a solenoid and/or relay device.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 19, for band scanning or selector circuit driven by a solenoid.
- SEE OR SEARCH CLASS:
- 310, Electrical Generator or Motor Structure, subclass 14, 24+, 30+, and 34+ for solenoid motor structure, per se, and subclass 49 for step-by-step magnetic motor structure.
- 318, Electricity: Motive Power Systems, appropriate subclasses, especially subclass 37 and 119+ for reciprocating or oscillating motor systems and subclasses 38 and 138 for linear movement electric motor systems.
- 361, Electricity: Electrical Systems and Devices, subclasses 139+ for electric circuits for relays and electromagnets.
- 11** This subclass is indented under the class definition. Subject matter wherein the tuned circuit includes a reactance element or elements which are directly responsive to a change in voltage and/or current which is applied across or through the reactance element or elements, with the variation in the voltage and/or current causing the reactance value of the element or elements to vary or change and thereby tune or adjust the resonance of the tuned circuit.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 4, for tuners which are responsive to an external magnetic field, e.g., the magnetic field is that of a spatially movable permanent magnet.
- 5+, for tuners which are responsive to an external nonelectrical stimulus or condition.
- SEE OR SEARCH CLASS:
- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices, per se.
- 307, Electrical Transmission or Interconnection Systems, subclasses 401+ for miscellaneous nonlinear reactor systems.
- 330, Amplifiers, subclass 145 for amplifiers having variable impedance elements which are directly responsive to voltage or current variations.
- 361, Electricity: Electrical Systems and Devices, subclasses 277+ for variable capacitors, per se.
- 455, Telecommunications, appropriate subclasses.

- 12** This subclass is indented under subclass 11. Subject matter wherein the inductor element is variable in response to current flow through the inductor winding or in response to a magnetic field or bias applied to the core element.

**SEE OR SEARCH CLASS:**

- 323, Electricity: Power Supply or Regulation Systems, subclass 206, 214, 249, 302, 310, and 329 for saturable core inductor systems in general.
- 331, Oscillators, subclass 181 for oscillators having frequency adjusting means which may be of the saturable core inductor type.
- 332, Modulators, appropriate subclasses and particularly subclass 173 for modulators having variable circuit parameters which may be a saturable core device.
- 333, Wave Transmission Lines and Networks, subclasses 177+ for transformer coupled wave filters having a magnetic core which may be saturable.
- 336, Inductor Devices, subclass 155 for inductor devices, per se, which are responsive to current flow there-through. See also the Search Notes for a complete field of search as to current responsive inductance devices.

- 13** This subclass is indented under subclass 12. Subject matter wherein the change in the reactance value of the saturable core type inductance element is controlled by circuit means which is responsive to an undesired change in frequency occurring in the tuned circuit, the circuit means thereby varying the resonant frequency of the tuned circuit a sufficient amount to compensate for the undesired frequency shift.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 16, for automatic frequency controlled tuner circuits having a reactance tuning means.
- 26+, for automatic frequency centering circuits which have an electromagnetic operator driving the tuning element.

**SEE OR SEARCH CLASS:**

- 331, Oscillators, appropriate subclasses, particularly subclass 36, for automatic frequency controlled oscillators which may utilize a saturable inductor.

- 14** This subclass is indented under subclass 11. Subject matter in which an active element is operated in such a manner that it presents the characteristics of a variable reactance to the rest of the tuned circuit.

**SEE OR SEARCH CLASS:**

- 331, Oscillators, subclass 180 for oscillators in which the variable frequency determining element consists of an active element type reactance tube.
- 332, Modulators, subclass 140 and 142+ for reactance tubes in frequency modulators and 147+ for reactance tubes in phase modulators.
- 333, Wave Transmission Lines and Networks, subclasses 213+ for reactance tube systems, per se.

- 15** This subclass is indented under subclass 14. Subject matter in which the active element is a semiconductor device.

- 16** This subclass is indented under subclass 14. Subject matter in which the variable reactance tuner is provided with control means for automatically tuning the resonant circuit to its optimum operating point and to maintain the circuit at that point by regulating the adjustment of the variable reactance tuner to compensate for variations in the tuned circuit or in the frequency of the signal wave to which the circuit is tuned.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 13, for automatic frequency controlled saturable core type inductor tuning elements.
- 26+, for automatic frequency centering circuits having an electromagnetic operator.

**SEE OR SEARCH CLASS:**

- 331, Oscillators, subclass 36 for oscillators with frequency control means which may be a reactance tube.

455, Telecommunications, appropriate subclasses.

**17** This subclass is indented under the class definition. Subject matter in which the tuned circuit consists of at least one variable reactance tuning unit which is adapted to have its reactance adjusted so as to vary the resonance of the tuner, the adjustable reactance tuning unit being driven by an electromagnetic operator which is mechanically connected to the variable tuning unit.

- (1) Note. The reactance tuning may be driven directly or indirectly by the electromagnetic operator. An example of an indirectly driven reactance tuning unit is where the electromagnetic operator is energized periodically and during these periods loads or winds an energy storage device such as a spring so that during the period when the electromagnetic operator is not energized, the energy storage device will furnish power to drive the variable reactance tuning unit.
- (2) Note. To be properly classified in this subclass significant details of the tuner must be disclosed and claimed. The mere recitation of a tuner broadly with details to the electromagnetic operator or control system for the operator will be classified with the operator or system.
- (3) Note. Switch type tuners are considered as variable reactance tuning units for classification in this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9+, for electromagnetic operated tuners which are remotely controlled.

SEE OR SEARCH CLASS:

- 310, Electrical Generator or Motor Structure, appropriate subclasses for electrical generator or motor structure, per se.
- 318, Electricity: Motive Power Systems, appropriate subclasses for electromagnetic operators with control systems, per se.

455, Telecommunications, appropriate subclasses.

**18** This subclass is indented under subclass 17. Subject matter in which the electromagnetic operator is provided with a control system and/or means which causes the operator to drive the variable tuning unit in such a manner as to scan a frequency or band of frequencies with the control system and/or means acting upon the electromagnetic operator or its associated circuit to stop the scanning of the tuner unit when the tuner is properly adjusted to receive a given signal or signals.

- (1) Note. Subject matter found in this subclass and the indented subclasses usually consists of a tuning system with a driving means which causes the tuner to scan the frequency band and when a radio signal is tuned in, a control voltage is applied to the means to deenergize the driving means and the tuner is stopped on the frequency of the radio signal. Tuners where the operator is connected to and energized by a switch which represents a particular frequency, the operation of the switch causing the operator to drive the tuner to and stop on the selected frequency, is not classified in this subclass but in subclass 29 below.

SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, subclasses 445+ for electromagnetic operator with control systems for automatically starting and/or stopping.

**19** This subclass is indented under subclass 18. Subject matter wherein the electromagnetic operator which furnishes the drive for the variable tuning unit is a solenoid and/or relay device.

- (1) Note. The solenoid may periodically act to load an energy storage device such as, for example, a spring with the energy storage device then acting to drive the variable tuning element. In these cases, the solenoid is considered to have furnished the drive for the variable tuner and the subject matter is properly classifiable in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

10+, for tuners which are remotely controlled and use a solenoid as a driver means.

SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, subclass 14, 23+, 30, and 34+ for solenoid motor structure, per se.

335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 220+ for magneto-mechanical motive devices.

361, Electricity: Electrical Systems and Devices, subclasses 139+ for electric circuits for relays and electromagnets.

455, Telecommunications, subclasses 170.1+ for receivers with frequency selective means (i.e., tuners) with solenoid or relay means.

**20** This subclass is indented under subclass 18. Subject matter wherein the electromagnetic operator is a motor of the rotating armature type.

(1) Note. Motors of the reciprocating or oscillating type are classified in subclass 18 above if they are driving a band scanning or selector circuit.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

9, for remote controlled tuners which may use an electric motor.

SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, appropriate subclass for motor control systems, per se.

**21** This subclass is indented under subclass 20. Subject matter wherein the electromagnetic operator is provided with a control system and/or means to select and tune the variable tuning unit to a predetermined position thereby adjusting the tuner to resonate at a particular mean frequency.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

7, for push button and/or lever operated tuners which are mechanically adjusted by the pressure exerted upon the button and/or lever to select or position a tuning element in a particular position.

9+, for remote controlled electromagnetic operators which may stop on a predetermined frequency such as, for example, a remotely controlled television tuner.

SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, appropriate subclasses, particularly subclasses 466+ for motors having control systems that stop the motor at a particular position.

**22** This subclass is indented under subclass 20. Subject matter wherein the motor is connected to means for reversing the direction in which the motor is driving the tuner element.

SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, appropriate subclasses, particularly subclass 65 and 280+ for motor systems connected to a motor-reversing circuit.

**23** This subclass is indented under subclass 20. Subject matter wherein the motor is connected to the variable tuning unit through a clutch device which is operated by the motor control circuit.

SEE OR SEARCH CLASS:

192, Clutches and Power-Stop Control, appropriate subclasses for clutches and power-stop controls, per se, and especially subclass .02 for interrelated electric motor and clutch controls.

310, Electrical Generator or Motor Structure, subclasses 92+ for electrical controlled torque-transmitting clutches or brakes.

**24** This subclass is indented under subclass 20. Subject matter wherein the motor is controlled by a relay device.

## SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 139+ for electric circuits for relays and electromagnets.

**25** This subclass is indented under subclass 24. Subject matter in which plural relays are used to control the motor circuit.

**26** This subclass is indented under subclass 17. Subject matter in which the electromagnetic operator is provided with a linkage device for connecting the operator to a variable tuning unit of a resonant circuit and a control means for automatically operating the electromagnetic operator so as to tune the resonant circuit to its optimum operating point and to maintain the circuit at that point by regulating the adjustment of the variable tuning unit to compensate for variations in the tuned circuit or in the frequency of the signal wave to which the circuit is tuned.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

13, for automatic frequency controlled saturable core type tuning elements.  
16, for automatic frequency centering circuits of the reactance tube type.

## SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, subclasses 445+ for automatic motor starting and/or stopping means.  
322, Electricity: Single Generator Systems, subclass 32 for dynamoelectric generator systems with frequency responsive devices or networks for automatically maintaining the frequency of the generator wave constant.  
331, Oscillators, subclasses 1+ for oscillators having automatic frequency stabilization using a phase or frequency sensing means.  
332, Modulators, subclasses 123+ for controlling an average condition in a frequency modulator and subclasses 155+ and 159+ for controlling an average condition in an amplitude modulator.  
455, Telecommunications, subclass 125 for radio transmitters which may utilize

a.f.c. circuits and subclasses 257+ for receivers with a.f.c. circuits.

**27** This subclass is indented under subclass 26. Subject matter in which the linkage device between the electromagnetic operator and variable tuning unit is a mechanical coupling element or tool which is adapted to be connected to or disconnected from the tuning element.

(1) Note. Subject matter usually found in this subclass consists of motor circuits which drive alignment tools such as, for example, a screwdriver which may be connected to the tuner element of a tuned circuit, the motor circuit then adjusts the resonance of the circuit to some preset value. Such tool driven aligning apparatus find particular use in production line tuning of a large number of tuned circuits.

## SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclasses 600+ for measuring and testing impedance, admittance and related quantities.  
330, Amplifiers, subclass 2 for amplifiers with condition indicating or testing means.

**28** This subclass is indented under subclass 26. Subject matter in which the electromagnetic operator control circuit is responsive to or requires two or more signal sources in order to properly center the resonant circuit.

(1) Note. Subject matter usually found in this subclass consists of circuits which have an information and test signal both applied to the electromagnetic operator control circuit so that the tuned circuit is properly adjusted to the desired resonant frequency.

**29** This subclass is indented under subclass 17. Subject matter wherein the electromagnetic operator is connected to or controlled by a position or sensing means which acts to position the variable reactance tuning unit in a predetermined position upon being actuated.

(1) Note. The motor control circuit is usually energized by a plurality of push but-

ton switches with each of the switches representing a preselected frequency (i.e., a television tuner driven by a motor). The motor once energized drives the tuner element to the proper position to tune in the desired frequency and then the motor is automatically turned off.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 7, for push button and/or lever operated tuners of the mechanical type which may tune in predetermined frequencies.
- 21, for motor operated band scanning or selector circuits which selects a predetermined frequency such as, for example, the strongest signal found within the band scanned.

**SEE OR SEARCH CLASS:**

- 318, Electricity: Motive Power Systems, subclasses 466+ for motor systems with movement, position or limit-of-travel sensing means. Also see subclasses 560+, for position servomechanisms.

**30** This subclass is indented under the class definition. Subject matter wherein the tuner is combined with some form of electrical indicator which operates in such a manner as to give an indication of whether or not the tuned circuit is tuned for maximum output signal strength or peak resonance.

- (1) Note. Subject matter found in this and the indented subclasses properly includes a frequency or phase demodulator with or without some detail tuning structure together with detailed tuning indicating structure provided the output from the frequency or phase demodulator is applied only to the indicating means. Details of a frequency or phase demodulator which have an output applied to other circuitry than the indicating means or where the indicating means is only claimed broadly in combination with a demodulator, classification is in Class 329, Demodulators and Detectors, subclass 111. See also (2) Note under Class 329, subclass 111.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 86+, for tuners including a device for conveying information as to the particular band or position within a band of frequencies to which the tuner circuit is adjusted.

**SEE OR SEARCH CLASS:**

- 250, Radiant Energy, subclass 39 for wave meters.
- 324, Electricity: Measuring and Testing, subclasses 76.39+ for measurement of the frequency of electrical energy.
- 329, Demodulators, appropriate subclasses for demodulators which may include some form of electrical indicator.
- 330, Amplifiers, subclass 2 for amplifiers with condition indicating or testing means.
- 331, Oscillators, for oscillators with indicator, signal or alarm.
- 332, Modulators, subclass 118 for indicating or measuring in a frequency modulator and subclass 150 for indicating or measuring in an amplitude modulator
- 340, Communications: Electrical, for electrical signaling generally, especially subclass 870.08 for radio dial indicators in telemetering systems and subclasses 657+ for current characteristic controlled electric signals or alarms.
- 348, Television, subclasses 569+ for television receiver tuners having a tuning indicator associated therewith.
- 455, Telecommunications, subclasses 154.1+ for receivers with tuning or resonance indicators.

**31** This subclass is indented under subclass 30. Subject matter wherein the resonance indicator is a meter, such as, for example, a galvanometer.

**32** This subclass is indented under subclass 31. Subject matter wherein the meter is combined with an optical and/or shading device.

- (1) Note. Usually the optical and/or shading device is connected directly to the meter movement in such a manner as to cause a

beam of light or a shadow to be cast upon a fixed scale thus giving an indication of the tuning of the resonant circuit.

- 33** This subclass is indented under subclass 30. Subject matter wherein the resonance indicator is of the cathode ray tube.

**SEE OR SEARCH CLASS:**

- 313, Electric Lamp and Discharge Devices, subclasses 364+, for cathode-ray tubes.
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 1+ for cathode-ray tube systems in general.
- 347, Incremental Printing of Symbolic Information, subclasses 121+ for electrostatic recorder using electron beam with an air tight envelope to create a charged pattern, and subclasses 226+ for radiation marking using cathode-ray tube.
- 348, Television, subclasses 569+ for television receiver tuners having a tuning indicator, wherein a cathode-ray tube including the picture display tube may be utilized to indicate tuning.

- 34** This subclass is indented under subclass 33. Subject matter wherein the cathode-ray tube has an annular anode coated with fluorescent material surrounding an emissive center cathode and a control electrode for varying the width of the discharge between the cathode and anode so that as the potential of the control electrode varies the width of the nonluminous portion of the anode varies.

**SEE OR SEARCH CLASS:**

- 313, Electric Lamp and Discharge Devices, subclass 107.5 for magic eye indicating tubes, per se.
- 324, Electricity: Measuring and Testing, subclass 121 for electrical measuring, testing or sensing circuits, per se, in which a magic eye tube is used.

- 35** This subclass is indented under subclass 34. Subject matter wherein plural nonluminous portions are produced on the fluorescent anode material.

- 36** This subclass is indented under subclass 30. Subject matter wherein the resonance indicator is an electric lamp.

**SEE OR SEARCH CLASS:**

- 313, Electric Lamp and Discharge Devices, appropriate subclass for electric lamp and discharge devices, per se.
- 340, Communications: Electrical, subclasses 654+ for electrical condition responsive pilot light indicator systems in general.

- 37** This subclass is indented under subclass 36. Subject matter wherein the resonance indicator lamp is of the gaseous glow discharge tube type, such as, for example, a neon lamp.

**SEE OR SEARCH CLASS:**

- 313, Electric Lamp and Discharge Devices, subclasses 567+ for electric lamp and discharge devices which include an envelope and an atmosphere of gas or vapor within the envelope. See also the Search Notes under this subclass for an additional field of search relating to gaseous discharge tubes and circuits.

- 38** This subclass is indented under the class definition. Subject matter in which a reactance element or elements of a tuned circuit is wound on a core and is adapted to be unwound therefrom, as on a second core, to change the reactance values of the tuned circuit.

- (1) Note. Examples of subject matter classified here include an inductor whose element is wound from an insulating core to a conducting core, the conducting core short-circuiting the portion of the inductor element wound thereon; or a capacitor which is varied by winding or unwinding one plate of the capacitor over a second insulated plate shaped in the form of a cylinder or core.

**SEE OR SEARCH CLASS:**

- 191, Electricity: Transmission to Vehicles, subclasses 12.2+ for an electric current supply conductor and reel means upon which the conductor may be wound.



- 242, Winding, Tensioning, or Guiding, appropriate subclasses for winding, tensioning, or guiding in general use.
- 336, Inductor Devices, subclass 15 for variable inductors whose effective length is changed by winding or unwinding the conductor forming the inductor.
- 338, Electrical Resistors, subclass 79, for mechanically variable resistors which are varied by winding or unwinding the resistance element from a core or form.
- 343, Communications: Radio Wave Antennas, subclass 877, for antennae having a reel upon which the antenna may be wound.
- 39** This subclass is indented under the class definition. Tuning devices in which the tuner is combined with structure other than tuner structure or some change in tuning structure and/or design which improves the operation of the tuner and which is not otherwise classified.
- SEE OR SEARCH CLASS:
- 84, Music, appropriate subclasses for musical devices that may use tuned circuits, especially subclasses 671 through 746 for electrical tone generation by the use of tuned sound generators or resonators. Also subclasses 423+ for keyboard operated musical devices, the keys serving to select the tuned circuit which is to be placed into circuit with an electrical tone generator.
- 219, Electric Heating, subclass 750 for microwave heating with tuned circuits.
- 322, Electricity: Single Generator Systems, subclass 78 for generator control systems which have plural impedances in the excitation circuit, the impedances forming a tuned circuit.
- 324, Electricity: Measuring and Testing, subclasses 600+ for tuners combined with means to measure the impedance, admittance and related quantities of the tuner.
- 329, Demodulators, appropriate subclasses for demodulators with tuning or indicating structure.
- 331, Oscillators, appropriate subclass for oscillators having a tuned circuit, especially subclasses 177+ for oscillators with frequency adjusting means.
- 336, Inductor Devices, subclasses 105+ for inductors combined with some other structure such as, for example, a connector.
- 343, Communications: Radio Wave Antennas, subclasses 350+, 850+ and 866+ for tuners combined with detailed antenna structure.
- 348, Television, subclass 731 for tuners combined with television receiver circuitry.
- 361, Electricity: Electrical Systems and Devices, subclass 113 for a safety and protective system or device combined with a tuned circuit; subclasses 268+ for a transformer or inductor combined with a switch, capacitor or lock; and subclasses 275.1+ for a capacitor combined with some other structure such as, for example, an electrical socket.
- 370, Multiplex Communications, appropriate subclasses for multiplex systems which are tunable by an inductor or capacitor.
- 373, Industrial Electric Heating Furnaces, subclasses 138+ for induction type electrical furnaces which may use a tuned circuit.
- 455, Telecommunications, appropriate subclasses.
- 40** This subclass is indented under the class definition. Subject matter wherein some resistance value is built into or adapted to be inserted into or removed from a tuned circuit to thereby vary the "Q" or damping of the circuit.
- (1) Note. The sharpness of the resonance or sensitivity of a tuned circuit is determined by the ratio of energy stored to energy dissipated, hence is directly proportional to the reactance in the circuit and inversely proportional to the resistance. This ratio of stored energy to dissipated energy is called the "Q" of the circuit.
- (2) Note. The resistance of the tuned circuit does not have to be of the variable type

but may be a fixed type resistance. The resistance must, however, be more than the inherent load resistance presented across the circuit when the circuit is connected to a load.

**SEE OR SEARCH CLASS:**

333, Wave Transmission Lines and Networks, subclass 173 for wave filter networks that may utilize ohmic resistance elements for controlling the selectivity or frequency band width of the network.

- 41** This subclass is indented under the class definition. Subject matter wherein the inductance and capacitance of the tuned circuit is of the distributed parameter type and is adapted to have the mean resonant frequency of the circuit adjusted in discrete, distinct steps; or where a plurality of tuned circuits are ganged together either mechanically and/or electrically so as to have their means resonant frequency adjusted in unison.

- (1) Note. Resonators, which are closely analogous to tuners found in this subclass, are classified in Class 333, Wave Transmission Lines and Networks, especially subclasses 219+. The resonators found in Class 333, subclasses 219+ comprise conductive enclosures, cavities, or wave transmission line sections of the two terminal type and have both distributed inductance and capacitance. Even though a resonator may be provided with tuning means and designated as a tuner, if the resonator is a single circuit having both inductance and capacitance of the distributed parameter type with the adjustment of the resonant frequency being of a continuous, unbroken type, classification is in Class 333, Wave Transmission Lines and Networks, subclasses 219+. Single circuits in which only the inductance and capacitance is of the distributed type are classified in this subclass and the indented subclasses thereunder. See also the notes under Class 333, subclasses 167 and 219.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 1+, especially subclass 3 for a resonator type tuner combined with some other type tuner such as, for example, a lumped inductor-capacitor circuit.

**SEE OR SEARCH CLASS:**

- 219, Electric Heating, subclass 750 for microwave heating with tuned circuits.
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 5.46+ for cathode-ray tube circuits in which the cathode ray passes through plural hollow distributed parameter devices that are tunable; subclasses 5.53+ for circuits in which the cathode ray passes through a tunable hollow distributed parameter device, and subclasses 39.55+ for distributed parameter resonator type magnetrons having variable tuning means.
- 330, Amplifiers, subclass 45 for a linear amplifier having an electron beam vacuum tube coupled to a cavity resonator; subclass 49 for a linear amplifier having a vacuum tube amplifying device which has distributed parameter characteristics which may involve a resonator, and subclass 56 for linear amplifiers involving wave guide, cavity, or concentric line resonator coupling generally.
- 331, Oscillators, subclass 5, 6+, 9, 79+, 86+, 93, and 96+ for oscillators which have a distributed parameter resonator.
- 332, Modulators, subclasses 129+ for resonators in a frequency modulator and subclasses 163+ for resonators in an amplitude modulator.
- 333, Wave Transmission Lines and Networks, subclasses 219+ for resonators of the distributed parameter type, per se. See (1) Note above.
- 343, Communications: Radio Wave Antennas, subclass 723 for single adjustable length electrically long linear antennae; subclasses 745+ for antennae with a variable reactance for tuning the antenna; subclasses 746 and 767+ for slot type antennae which

- may involve resonator structure; subclasses 790+ for sleeve type antennae; subclasses 793+ for balanced doublet type antennae which may have resonant characteristics, and subclasses 825+ and 843 for antennae having appreciable wave length dimensions.
- 455, Telecommunications, subclasses 120+ for transmitters involving wave filters, subclasses 150.1+ for receivers with filters or tuners and subclasses 78+ for wave meters using tuners or filters.
- 42** This subclass is indented under subclass 41. Subject matter wherein two or more distributed parameter type tuners are electrically and/or mechanically interlinked so as to be simultaneously adjusted over a given frequency range.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
1+, for combined diverse type tuners.
- 43** This subclass is indented under subclass 42. Subject matter wherein the distributed parameter type tuners are adjusted by a shaft operator.
- (1) Note. Plural distributed parameter type tuners which are simultaneously adjusted by a cam or screw driven by a shaft are not classified in this subclass but in subclass 42 above.
- SEE OR SEARCH CLASS:  
74, Machine Element or Mechanism, subclasses 10+ for shaft operators, per se, which are particularly adapted to drive or rotate a radio tuning shaft.
- 44** This subclass is indented under subclass 41. Subject matter wherein the inductance and/or capacitance having the distributed reactance is adapted to be deformed, as by bending, twisting or collapsing, so that the distributed reactance is varied thus varying the frequency of the tuned circuit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
46, for tuners which have a lumped reactance element which is varied by compression or deformation.
- 45** This subclass is indented under subclass 41. Subject matter in which at least a portion of the capacitance necessary to tune the resonant circuit is furnished by a lumped capacitor.
- (1) Note. The lumped capacitor is usually variable and is used to tune the resonant circuit, however, the capacitor may be fixed in value.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
78+, for tuners which are tuned by a variable capacitor.
- 46** This subclass is indented under the class definition. Subject matter wherein a tuned circuit includes a lumped deformable type tuning element or elements together with the necessary mechanical structure for modifying the shape of the tuning element, as by changing the physical shape of the tuning element or elements to thereby change the reactance of the tuned circuit.
- (1) Note. The compressing together of a plurality of capacitor plates to thereby vary the capacitance of the unit is not considered as deforming the element and, thus, is not properly classified in this subclass but in subclass 80 below.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
44, for tuned circuits having distributed parameter type inductance and/or capacitance which is adapted to be deformed to vary the tuning of the circuit.  
80, for capacitors which have plates which are movable so as to vary the spacing between the plates as for example, by compressing the plates together. See (1) Note above.
- SEE OR SEARCH CLASS:  
336, Inductor Devices, subclass 20 for tuners with deformable or distortable coil and/or core. See also the Search Notes for a detailed field of search as to deformable inductor type devices.

- 338, Electrical Resistors, subclass 114 for resistor elements which are of the deformable type.
- 47** This subclass is indented under the class definition. Subject matter wherein an element or elements of at least one tuned circuit is modified or substituted by a switching operation to thereby effectively change the resonant frequency to which the circuit is tuned.
- (1) Note. The switching operation may be performed by a make and break mechanical switch or by an electrical switch such as a tube or semiconductor device. Plug in type tuned circuits are also properly classified in the subclass.
  - (2) Note. The modifying or substituting of the tuning circuit may be accomplished by shorting a portion of one or more of the tuned circuit elements, thus varying the frequency of the circuit, or by substituting elements in the tuned circuit or by switching one complete tuned circuit for another such as generally found in television tuners. Fine tuning of the tuned circuit may be accomplished by using an adjustable inductor and/or capacitor in addition to the switching means.
  - (3) Note. The mere operation of a switch which does not effect the tuning of the tuned circuit is not classified in this subclass but in subclass 39 above.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 7, for push button and/or lever mechanically operated tuners which may be of the switch type.
- 86+, for tuners having an indicator to show the position or frequency to which the variable tuning element or elements are adjusted or switched.
- SEE OR SEARCH CLASS:
- 74, Machine Element or Mechanism, subclasses 10+ for mechanical mechanism for rotating a shaft including such mechanism designed for use with a switching means. See also the Search Notes to subclass 10 for additional fields of search for moving mechanism.
- 200, Electricity: Circuit Makers and Breakers, appropriate subclasses for the construction of make and break type switching elements, per se.
- 323, Electricity: Power Supply or Regulation Systems, subclass 255 and 340 for tap changers.
- 336, Inductor Devices, subclasses 137+ for the structure of inductors having means to change the length or connection of the inductor.
- 343, Communications: Radio Wave Antennas, subclass 748 for loop type antennae with a variable reactance for tuning the antenna, and subclass 868 for loop type antennae having means for adjusting the coil length.
- 48** This subclass is indented under subclass 47. Subject matter wherein the switch type tuner is constructed so as to have a contact terminal or plate which is adapted to contact or approach a second terminal or plate held on a stationary portion of the tuner unit, the contact terminals or plates of the tuner being constructed so as to allow a rocking movement between the movable and stationary contacts, thus varying the resonant frequency of the tuned circuit without breaking electrical contact between the stationary and movable contacts.
- 49** This subclass is indented under subclass 47. Subject matter wherein the element or elements of the tuner are carried upon a flat circular plate or disk type support with the plate or disk support revolving about its center axis and thereby switching the element or elements into or out of a circuit in a predetermined order.
- (1) Note. A turret tuner of the disk type, such as found in this subclass, or of the drum type, such as found in subclasses 51+ below, are basically of the switching type in which the movable turret portion carries tuning elements and contact members which are moved with respect to a group of stationary contacts. A switch type unit having stationary tuning elements connected to stationary contact elements with the stationary contacts being swept or switched into or out of circuit by a rotating contact are not clas-

sified in this subclass nor in subclasses 51+ below but are found in the appropriate subclasses under subclasses 47+.

**SEE OR SEARCH CLASS:**

74, Machine Element or Mechanism, subclasses 10+ for mechanical mechanism for rotating a shaft including such mechanism designed for use in a disk type turret tuner. See also the Search Notes to subclass 10 for additional fields of search for moving mechanism.

200, Electricity: Circuit Makers and Breakers, subclasses 1+ for multiple control circuit switches, and subclasses 19.06+ for circuit makers and breakers which operate periodically to control multiple circuits.

**50** This subclass is indented under subclass 47. Subject matter wherein the switching unit consists of a rotatable drum or cylinder having a plurality of individual components or tuning elements secured in position about the periphery of the drum or cylinder, the components or tuning elements being connected to contact elements which are also carried on the periphery of the drum or cylinder, and rotating means to move the drum or cylinder about its longitudinal axis to thereby bring the contacts located on the drum or cylinder into contact with stationary contacts located on a support member adjacent a portion of the surface of the drum or cylinder.

(1) Note. For the difference between subject matter found in this subclass and the other subclasses under 47+, see (1) Note under subclass 49 above.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

2, for a plurality of diverse disk or diverse turret tuners combined together either mechanically or electrically.

**SEE OR SEARCH CLASS:**

74, Machine Element or Mechanism, subclasses 10+ and the subclasses specified in the notes thereto for mechanical mechanism for rotating a shaft including such mechanism designed

for use with a switching means. See also the Search Notes to subclass 10 for additional fields of search for moving mechanism.

200, Electricity: Circuit Makers and Breakers, subclasses 1+ for multiple control circuit switches, and subclasses 19.06+ for circuit makers and breakers which operate periodically to control multiple circuits.

**51** This subclass is indented under subclass 50. Subject matter in which the tuner has means associated therewith to give fine tuning or adjustment to the tuned circuit.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

48, for tuners wherein fine tuning is achieved by rocking the tuner switch.

57+, for vernier tuning means combined with a tuner which is adjusted by modifying or substituting the inductor element by switching.

71+, for tuned circuits in which the resonant frequency is varied by a continuously variable inductor.

78+, for tuned circuits in which the resonant frequency is varied by a continuously variable capacitor.

86+, for tuners having an indicator to show the position or frequency to which the variable tuning element or elements are adjusted.

**52** This subclass is indented under subclass 47. Subject matter in which the switching means used to vary or change the frequency setting or band of frequencies to which the tuner is resonant is operated by the adjustment or movement of a variable tuning means such as a variable capacitor.

(1) Note. An example of the type of tuner found in this subclass is one in which a variable capacitor, adapted to rotate through 360°, is used to fine tune or spread a given frequency to which the tuner is resonant with special switching means being associated with the capacitor to thereby switch into the tuned circuit various other tuning elements each time the capacitor is rotated through one complete revolution and thus change the

band of frequencies to which the tuner is resonant.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

65+, for tuners in general wherein both inductor and capacitor are variable.

- 53** This subclass is indented under subclass 52. Subject matter in which the switch is of the rectilinearly movable or reciprocating contact type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

54, for tuners which are varied by switching various elements into or out of the tune circuit where the switch is rectilinearly operated.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, subclass 16 for reciprocating type switches used to control multiple circuits; subclasses 449+ for reciprocating switches having a snap action, and subclasses 554+ for mechanically operated switches having a knife blade or plug which moves in a reciprocating manner.

- 54** This subclass is indented under subclass 47. Subject matter in which the switch is of the rectilinearly movable or reciprocating contact type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53, for tuners having a rectilinearly operated switch which is operated by a variable tuning means.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, subclass 16 for reciprocating type switches used to control multiple circuits; subclasses 449+ for reciprocating switches having a snap action, and subclasses 554+ for mechanically operated switches having a knife blade or plug which moves in a reciprocating manner.

- 55** This subclass is indented under subclass 47. Subject matter in which the element or elements substituted by the switching operation consists of a plurality of capacitors.

- (1) Note. Subject matter usually found in this subclass consists of an inductor element which is mechanically fixed in the tuned circuit and is connected to a switch which substitutes various capacitors into or out of the circuit to thus vary the resonant frequency of the tuner.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 7, for push button and/or lever operated tuners which may be of the type which substitutes one capacitor for another within the tuned circuit.  
78+, for tuner units which are tuned by a continuous variable capacitor.

SEE OR SEARCH CLASS:

320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for charging or discharging a capacitor, per se.

- 56** This subclass is indented under subclass 47. Subject matter in which the element or elements substituted by the switching operation consists of a plurality of inductors.

- (1) Note. Subject matter usually found in this subclass consists of a capacitor element which is mechanically fixed in the tuned circuit and is connected to a switch which substitutes various inductors into or out of the circuit to thus vary the resonant frequency of the tuner.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 7, for push button and/or lever operated tuners which may be of the type which substitutes one inductor for another within the tuned circuit.  
71+, for tuner units which are tuned by a continuous variable inductor.

SEE OR SEARCH CLASS:

336, Inductor Devices, subclasses 137+ for inductors having means to change the

- length or connections of the inductor. See Search Notes under subclass 137 for additional fields of search as to variable inductance devices.
- 57** This subclass is indented under subclass 56. Subject matter in which the tuner has means associated therewith to give fine tuning or adjustment to the tuned circuit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 51, for vernier tuning means combined with a drum or cylinder type turret tuner.
- 71+, for tuned circuits in which the resonant frequency is varied by a continuously variable inductor.
- 58** This subclass is indented under subclass 57. Subject matter wherein the vernier tuning means is a variable capacitor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 78+, for tuned circuits in which the resonant frequency is varied by a continuously varied capacitor.
- SEE OR SEARCH CLASS:
- 361, Electricity: Electrical Systems and Devices, subclasses 271+ for capacitors, per se. See also the Search Notes under this subclass for a complete field of search as to capacitors.
- 59** This subclass is indented under subclass 47. Subject matter in which a selector switch is operated in such a manner as to introduce into a selector circuit an independent set of frequency determining parameters consisting of a tuned transformer circuit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 61+, for tuners having mutual inductance variable means which may be a tuned transformer circuit.
- SEE OR SEARCH CLASS:
- 307, Electrical Transmission or Interconnection Systems, appropriate subclasses, especially subclass 83 for plural transformer systems in general.
- 323, Electricity: Power Supply or Regulation Systems, subclass 247, 301, 305, and 328 for transformer systems in voltage magnitude control systems.
- 330, Amplifiers, subclass 154 for cascaded amplifiers with different coupling between the stages, one of which is a transformer, and subclasses 165+ for transformers used as inter-stage coupling between amplifier stages.
- 333, Wave Transmission Lines and Networks, subclasses 177+ for wave transmission transformer coupled circuits of the passive type, generally.
- 336, Inductor Devices, appropriate subclass for transformer structure.
- 361, Electricity: Electrical Systems and Devices, subclasses 268+ for transformers with integral switch, condenser or lock means.
- 60** This subclass is indented under subclass 59. Subject matter wherein the tuned circuit or a portion thereof is short circuited by a switching device to thus vary the frequency or band of frequencies at which the circuit will resonate.
- 61** This subclass is indented under the class definition. Subject matter wherein a variable tuned circuit or circuits consists of at least two or more windings which are so constructed or located that the windings are mutually coupled together by the magnetic field or the electric and magnetic fields created by and existing between the windings, with means being present in the circuit or circuits to vary the electrical and/or magnetic coupling existing between the windings so as to cause or effect a change in the mean resonant frequency and thus vary the tuning of the circuit or circuits.
- (1) Note. The two or more mutual inductance coupled windings may be in effect two coils connected in series or a single winding folded upon itself as, for example, a variometer.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 59+, for tuned transformer substitution circuits.
- 65+, for tuners in which both the inductor and capacitor are variable.

71+, for tuners which are tuned by a variable inductor.

**SEE OR SEARCH CLASS:**

- 323, Electricity: Power Supply or Regulation Systems, subclass 247, 301, 305, 328, and 355 for transformer systems.
- 330, Amplifiers, subclass 154, 165+, 188+, and 195+ for amplifiers having transformer coupling.
- 333, Wave Transmission Lines and Networks, subclasses 167+ for coupling networks of the wave filter type which are adapted to pass or reject only a single frequency or band of frequencies particularly indented subclasses 177+ for transformer coupled filters.
- 336, Inductor Devices, appropriate subclass for transformers which are not designed to be frequency responsive.
- 343, Communications: Radio Wave Antennas, subclasses 850+ for antennae with coupling network or impedance in the lead-in.
- 361, Electricity: Electrical Systems and Devices subclasses 268+ for transformers or inductors combined with a switch, condenser or lock.
- 379, Telephonic Communications, subclass 443 for induction coils combined with the structure of telephone instruments.

**62** This subclass is indented under subclass 61. Subject matter wherein the variable mutual inductance device consists of two coils connected in series and so mounted that one coil can be rotated within the magnetic field or the electric and magnetic field of the other.

**SEE OR SEARCH CLASS:**

- 323, Electricity: Power Supply or Regulation Systems, subclass 216, 264, and 347 for transformer systems with movable structure or windings.
- 333, Wave Transmission Lines and Networks, subclasses 24+ for coupling networks, including filters, equalizers and delay networks having relatively movable coils, and especially subclasses 177+ for transformer coupled wave filters.

336, Inductor Devices, subclasses 115+ for inductor structures having relatively movable coils.

**63** This subclass is indented under subclass 61. Subject matter in which a plurality of coils or windings are so arranged as to have a core common to all the coils or winding with the core, when moved, causing the inductance of each of the plural coils or windings to vary simultaneously.

- (1) Note. A single winding of wire having a plurality of tap connections, each of which is adapted to be connected to different circuits, is considered formed by a plurality of coils connected together to form a single winding or coil and is properly classified in this subclass if the coils have a common core for adjusting the inductance value of the coils.

**SEE OR SEARCH CLASS:**

- 336, Inductor Devices, subclass 118 and 130+ for inductor device structures having relatively movable core and coils.
- 343, Communications: Radio Wave Antennas, subclass 748 for loop type antennae with a variable reactance for tuning the antenna.

**64** This subclass is indented under the class definition. Subject matter wherein the inductor and capacitor are electrically connected in series so as to form a tuner of the series resonant type, the impedance of the resulting two terminal series network being a minimum at resonance.

**65** This subclass is indented under the class definition. Subject matter in which at least an inductor and capacitor are electrically connected together to form a parallel tuned circuit, both the inductor and capacitor being of the continuously variable type.

- (1) Note. A variable capacitor connected to an inductor which is varied by switching the inductor or a portion thereof, into or out of a circuit is not classified in this subclass but is found in subclasses 47+ above. Also, a variable inductor connected to fixed capacitors which are switched into or out of a circuit is found



in subclasses 47+ above. Note particularly subclasses 55 and 56+.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

64, for series tuned circuits which may have both a variable inductor and capacitor.

**SEE OR SEARCH CLASS:**

74, Machine Element or Mechanism, subclasses 10+ for drive means for a tuner which may be operating a variable inductor and/or capacitor.

336, Inductor Devices, appropriate subclasses for inductor structure, per se.

361, Electricity: Electrical Systems and Devices, subclasses 271+ for capacitor structure, per se. See also the Search Notes to this subclass for a complete field of search as to capacitors.

**66** This subclass is indented under subclass 65. Subject matter wherein the inductor and capacitor of the tuned circuit have a common mutually variable inductance and capacitance structure, the adjustment of which effects both the inductance and capacitance value of the tuned circuit simultaneously.

(1) Note. A mutually variable adjustment element is limited to an element in common with both the inductor and capacitor that causes simultaneous variations in the respective reactance characteristics of both the inductor and capacitor.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

69+, for tuners in which the inductor and capacitor are simultaneously varied, but wherein the inductor and capacitor have no reactance structure in common.

**67** This subclass is indented under subclass 66. Subject matter wherein the tuner includes a tuning unit having a variable capacitor type configuration with the self inductance of the mechanical structure of the capacitor and the capacitance of the capacitor forming a tuned circuit, the rotational displacement of the rotor of the variable capacitor simultaneously vary-

ing both the capacitance and the inductance of the unit.

(1) Note. Butterfly tuners generally consists of a pair of capacitor stators of generally quadrantal shape, a complete annular band surrounding and supporting the stators and forming parallel inductive paths between the capacitor stators, and a rotor having elements in capacitative relation to the stator and in inductive relation to the band and movable to vary both the capacitance and the inductance of the unit.

(2) Note. Semibutterfly and coaxial butterfly tuners are properly classified in this subclass.

**SEE OR SEARCH CLASS:**

331, Oscillators, subclass 95 for oscillators having a butterfly resonator circuit.

**68** This subclass is indented under subclass 66. Subject matter wherein the tuning element which is mutually common to both the inductor and capacitor portion of the parallel tuned circuit is movable rectilinearly in respect to the inductor and capacitor.

**69** This subclass is indented under subclass 65. Subject matter wherein the inductor and capacitor are so constructed or mechanically connected together that simultaneous variation of the inductance and capacitance values occurs when the tuner is adjusted or tuned.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

41+, for tuners in which the inductance and capacitance is of the distributed parameter type and in which the inductance and capacitance may be varied simultaneously in discrete increments.

66+, for tuners with variable inductor and capacitor structure in common.

**70** This subclass is indented under subclass 69. Subject matter wherein the variable inductor element is of the adjustable core type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

74+, for tuners in which the capacitor is fixed and the inductor is of the adjustable core type.

SEE OR SEARCH CLASS:

336, Inductor Devices, subclasses 117+ and 130+ for the structure of inductors having a relatively movable core.

**71** This subclass is indented under the class definition. Subject matter wherein a parallel tuned circuit consists of a capacitor of fixed capacitance value and a variable inductor, the inductance value of which may be varied over a given range in order to tune the the circuit over a range or band of frequencies.

(1) Note. To be properly classified in this subclass, the inductor must be of a variable type. If fixed inductors are switched into or out of a tuned circuit to thereby vary the frequency, classification is not in this subclass but in subclasses 56+ above.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

4, for tuners having an inductor which may be varied by an external magnetic field.

12+, for tuning units having a saturable core type inductor which are directly responsive to voltage and/or current variation.

38, for tuners having an inductance which is varied by winding or unwinding the inductor coil.

56+, for tuned circuits using fixed inductors which are switched into or out of circuit to thus vary the resonance frequency of the circuit.

61+, for tuners having mutual inductance variable means.

65+, for tuners where both the inductor and capacitor are variable.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 602.1 for methods of making helical or wound inductance devices involving metal working and assembly.

72, Metal Deforming, subclass 66 and 135+ for a method of or apparatus for coiling metal.

74, Machine Element or Mechanism, subclasses 10+ for drive means for a shaft operated radio tuner which may be operating a variable inductor.

174, Electricity: Conductors and Insulators, subclass 138 for insulators, per se, upon which an inductor may be wound.

219, Electric Heating, subclasses 600+ for induction heating devices.

242, Winding, Tensioning, or Guiding, subclasses 430+ for a process or apparatus for forming an article (e.g., an inductor, capacitor, or resistor) by winding material onto a core and subclasses 118+, 159+, and 600+ for a spool for receiving wound material.

323, Electricity: Power Supply or Regulation Systems, subclass 255 and 340 for adjustable or variable inductor device systems.

331, Oscillators, subclasses 167+ for L-C type oscillators generally and subclass 181 for variable inductance tuned oscillators. See also the Search Notes under these subclasses.

336, Inductor Devices, appropriate subclass for the structure of inductor devices, per se.

338, Electrical Resistors, subclasses 283+ for zigzag or sinuous resistance elements and subclasses 296+ for helical or wound resistance elements.

**72** This subclass is indented under subclass 71. Subject matter wherein a movable contact is adjustable along the length of the inductor element to thereby vary the effective inductance of the inductor and thus tune the circuit over a range or band of frequency.

(1) Note. The contact does not necessarily have to make physical contact with the inductance winding but may be capacitively coupled thereto. If capacitor type contacts are present classification is indented subclass 73 below.

(2) Note. When the contact is stationary and the inductor element movable, classifica-

tion is not in this subclass but in subclass 71 above.

**SEE OR SEARCH CLASS:**

- 336, Inductor Devices, subclasses 139+ for variable inductor devices having a contact which follows a helical conductor, and subclass 149 for inductors having a contact slidable on the coil winding.
- 338, Electrical Resistors, subclasses 118+ for a variable resistor having a contact which moves along the length of a resistance element.

**73** This subclass is indented under subclass 72. Subject matter in which the movable contact element does not come into direct electrical contact with the inductor coil but is capacitively coupled thereto.

- (1) Note. Usually there is an insulative coating between the movable contact and the coil windings thus preventing the contact from making direct electrical contact with the coil. The contact surface usually serves as one plate of a capacitor with the coil of the inductor serving as the second capacitor plate. Electrical energy is transferred between these capacitor plates.

**74** This subclass is indented under subclass 71. Subject matter wherein the frequency of the tuned circuit is varied by moving a core of material in the magnetic or the electric and magnetic field of an inductor element.

- (1) Note. The core of material used to tune the tuned circuit is not restricted to any particular shape but may be of any desired configuration.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 70, for core tuned inductors in which both the capacitance and inductance of the tuned circuit are simultaneously varied.

**SEE OR SEARCH CLASS:**

- 330, Amplifiers, subclass 169 for amplifiers having transformer coupling

including means for adjusting inductive coupling of transformer.

- 336, Inductor Devices, subclasses 117+ and 130+ for inductors having a relatively movable core and coil.
- 343, Communications: Radio Wave Antennas, subclass 748 for loop type antennae with a variable reactance (e.g., adjustable core) for tuning the antenna.

**75** This subclass is indented under subclass 74. Subject matter wherein the inductor is formed and/or wound in an irregular or varying configuration as, for example, a tapered winding.

- (1) Note. Inductors formed by coating a strip of conductive material upon a coil form in an irregular or varying configuration are properly classified in this subclass.

**SEE OR SEARCH CLASS:**

- 29, Metal Working, subclass 602.1 for methods of making helical or wound inductance devices involving metal working and assembly.
- 174, Electricity: Conductors and Insulators, subclass 138 for insulators, per se, upon which an inductor may be wound.
- 242, Winding, Tensioning, or Guiding, subclasses 430+ for a process or apparatus for forming an article (e.g., an inductor, capacitor, or resistor) by winding material onto a core and subclasses 118+, 159+, and 600+ for a spool for receiving wound material.
- 336, Inductor Devices, subclass 200 for printed circuit type coils and subclasses 225+ for the structure of inductor coils of special configuration.
- 338, Electrical Resistors, subclasses 283+ for zigzag or sinuous resistance elements and subclasses 296+ for helical or wound resistance elements.

**76** This subclass is indented under subclass 74. Subject matter wherein the core is of a particular shape and/or constructed out of a particular type material or materials.

- (1) Note. Cores having particular physical dimensions are properly classified in this subclass.

SEE OR SEARCH CLASS:

- 336, Inductor Devices, subclasses 233+ for cores used in inductance devices. Also see Search Notes under this subclass for a complete field of search on core structure and materials.

- 77** This subclass is indented under subclass 74. Subject matter wherein a plurality of variable inductor tuners of the adjustable core type are so constructed and/or mechanically interlinked as to move in unison thereby adjusting together the respective tuning cores of each tuned circuit.

SEE OR SEARCH CLASS:

- 333, Wave Transmission Lines and Networks, subclasses 24+ for coupling networks including plural coils and plural cores, and particularly indented subclasses 177+ for transformer coupling wave filters with magnetic core inductance.
- 336, Inductor Devices, subclasses 131+ for plural coils having plural movable cores which may be adjusted in unison.
- 338, Electrical Resistors, subclasses 130+ for ganged resistor elements.

- 78** This subclass is indented under the class definition. Subject matter wherein a parallel tuned circuit consists of an inductor of fixed inductance value and a tuning capacitor, the capacitance value of which may be varied over a given range in order to tune the circuit over a range or band of frequencies.

- (1) Note. To be properly classified in this subclass, the capacitor must be of a variable type. If fixed capacitors are switched into and out of a tuned circuit to thereby vary the frequency, classification is not in this subclass but in subclass 55 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 11+, for voltage and/or current responsive tuning elements which may be capacitors.
- 45, for distributed parameter type tuners which use a lumped capacitor which may be variable.
- 51, for turret tuners of the switching drum type having vernier tuning means which may be a variable capacitor.
- 55, for tuned circuits using fixed capacitors switched in or out of the circuit.
- 58, for switched inductor structures provided with vernier variable capacitor means.
- 64, for series tuned circuits which may use a variable capacitor.
- 65+, for tuners where both the inductor and capacitor are variable.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclasses 10+ for drive means for a shaft operated radio tuner which may be operating a variable capacitor.
- 331, Oscillators, subclasses 167+ for L-C type oscillators generally. See also the Search Notes under this subclass for L-C type oscillator circuits generally.
- 361, Electricity: Electrical Systems and Devices, subclasses 268+ for a transformer or inductor combined with a capacitor, and subclasses 271+ for capacitors, per se, particularly indented subclasses 277+ for variable capacitors. See also the Search Notes under this subclass for a complete field of search as to capacitors.

- 79** This subclass is indented under subclass 78. Subject matter comprising a tuner having a variable capacitor which is so constructed and/or driven by an adjusting means that if the frequency variation or change produced in the tuner by the adjustment of the variable capacitor is plotted along the abscissa and the movement or variation of the variable capacitor is plotted along the ordinate of a graph, the line produced would be linear.

- (1) Note. Straight line frequency variation as found in this subclass may be obtained by proper design of the profile or cross section of the plates of the condenser, or of the cam or other equivalent driving devices, or by proper combinations of variable and fixed capacitors.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 82, for tuners wherein the capacitor plates are arranged in a particular manner or have a particular shape.

- 80** This subclass is indented under subclass 78. Subject matter in which the variable capacitor is so constructed that the spacing between the plates of the capacitor may be varied to thus change the capacitance of the capacitor as, for example, by placing a series of resiliently biased stacked plates under a variable pressure.

- 81** This subclass is indented under subclass 78. Subject matter wherein the variable capacitor is of the sliding plate type which variably interleaves in a rectilinear manner.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 73, for variable inductor tuners which have a capacitor type contact which usually moves rectilinearly along a coil winding.

**SEE OR SEARCH CLASS:**

- 361, Electricity: Electrical Systems and Devices, subclass 296 for capacitors of the rectilinearly slidable plate type.

- 82** This subclass is indented under subclass 78. Subject matter in which the variable capacitor plates are shaped and/or arranged in a particular or special manner to give a special tuning operation.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 79, for variable capacitors which are designed to give a linear frequency versus capacitor setting tuning curve and which may be of a special shape and/or arrangement.

- 83** This subclass is indented under subclass 78. Subject matter wherein two or more variable capacitors are mechanically interlinked to move in unison.

**SEE OR SEARCH CLASS:**

- 338, Electrical Resistors, subclass 130 for plural mechanically variable resistors which are gang operated, the means of interlinking variable resistors being analogous to that used in connecting together plural capacitors.
- 361, Electricity: Electrical Systems and Devices, subclasses 299.1+ for plural variable capacitors of the rotary plate type which may be ganged together.

- 84** This subclass is indented under subclass 78. Subject matter wherein the variable capacitor has a significant operating or driving means such as, for example, a gear train or cam operator.

**SEE OR SEARCH THIS CLASS, SUB-CLASS:**

- 17+, for tuning units which may use a variable capacitor which is driven or adjusted by an electromagnetic operator.

**SEE OR SEARCH CLASS:**

- 74, Machine Element or Mechanism, subclasses 10+ for assemblies particularly adapted for mechanically rotating one or more shafts of electronic tuning devices into desired angular positions. See also the Search Notes under this subclass for a complete field of search on driving assemblies.

- 85** This subclass is indented under the class definition. Subject matter wherein the tuner device is substantially completely covered or surrounded by an enclosure and/or a barrier or screen is present for shielding at least a part of the tuner device from external electrical, magnetic or electromagnetic fields, or for protecting part of the tuner device from such fields originating in another part of the circuit, or for preventing the tuner device from emanating such fields or waves containing such fields.

## SEE OR SEARCH CLASS:

- 174, Electricity: Conductors and Insulators, subclasses 35+ for electrically shielded electrical conductors and insulators; or electrical shields or screens not classifiable in other subclasses of this class, and subclasses 50+ for electrical boxes and houses, per se. Also see the Search Notes under these subclasses for an additional field of search.
- 336, Inductor Devices, subclasses 84+ for inductor devices with electric and/or magnetic shielding means, and subclasses 90+ for housings for inductors.
- 338, Electrical Resistors, subclasses 64+ for resistors having electrical shield, and subclasses 226+ for incased, embedded or housed resistor devices. See also the Search Notes under subclass 226 for a complete field of search on housings.
- 455, Telecommunications, appropriate subclasses.

- 86** This subclass is indented under the class definition. Mechanisms which include a device for conveying information as the particular band or position within a band of frequencies to which a tuned circuit is adjusted. Usually the indicator is pointer and scale type which is attached to the movable shaft of an adjustable tuner unit.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 30+, for circuits which indicate when a tuner is properly adjusted to resonance as, for example, the tuning in of a particular radio signal.

## SEE OR SEARCH CLASS:

- 40, Card, Picture, or Sign Exhibiting, appropriate subclasses, for card, picture or sign exhibits, either stationary or which may be made to appear at windows or apertures. This class provides for means used for displaying information. The information that is displayed may be the position or band of frequencies to which a tuner is adjusted.

- 74, Machine Element or Mechanism, subclasses 10+ for assemblies particularly adapted to rotate one or more shafts of an electronic tuning device and which may also include mechanical dial operators.
- 116, Signals and Indicators, subclasses 241+ for position indicating means of the visual type.
- 250, Radiant Energy, subclass 250 for wave meters.
- 336, Inductor Devices, subclass 45 for transformers and inductive reactors having a movable element and a position or extent of motion indicator.
- 340, Communications: Electrical, appropriate subclasses, for electrically actuated or controlled signals and indicators, especially subclasses 870.01+ for telemetric systems.
- 361, Electricity: Electrical Systems and Devices, subclass 300 for a capacitor having an indicating means.
- 362, Illumination, appropriate subclasses for light combined with other structure, and especially subclasses 23+ for dial illumination.

- 87** This subclass is indented under subclass 86. Subject matter in which the indicator is adapted to indicate in which band of frequencies a tuner is operating where the tuner is of the type which is adapted to cover a plurality of such bands.

- (1) Note. An example of the type of indicator found in this class is a television channel indicator.

- 88** This subclass is indented under the class definition. Subject matter in which means, such as a detent or electrical braking circuit, is provided to check or arrest the motion of the tuner adjusting shaft or device at a preset position or at a given time.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 17+, for tuners driven by an electromagnetic operator and so constructed as to scan a band of frequencies and stop on a given signal within that band of frequencies. A signal seeking tuner is an

- example of the type of unit found in this group of subclasses.
- 30+, for circuits which indicate when a tuner is properly adjusted to resonance as, for example, the tuning in of a particular radio signal.
- 86+, for tuners having an indicator or dial to show the position or degree of movement of the tuner drive means.

**SEE OR SEARCH CLASS:**

- 74, Machine Element or Mechanism, subclass 10.41 for shaft operated preselected position devices having detent or clicker means, and subclasses 527+ for detents, per se.
- 192, Clutches and Power-Stop Control, subclasses 116.5+ for mechanisms for stopping a machine when a preset condition occurs.
- 89** This subclass is indented under the class definition. Subject matter which is not provided for in any of the preceding subclasses in this class and which is not otherwise classified.

END